



Laboratory Equipment Manufacturer  
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## INSTRUCTION MANUAL TEMPERATURE CALIBRATOR CALI-650H1/H2



**PLEASE READ THIS MANUAL CAREFULLY BEFORE  
OPERATION**

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symbols used throughout the manual.

DESCRIPTION	SYMBOL	S.NO
<b>Read the user manual before operating the instrument.</b>		<b>1</b>
<b>Warning- conditions that may pose hazards to the user.</b>		<b>2</b>
<b>Hot surface- areas which are at high temperature.</b>		<b>3</b>
<b>Electric shock – condition that may cause injuries to the User.</b>		<b>4</b>
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<b>Caution-Condition that may damage the instrument.</b>		<b>6</b>


## 1.2 SAFETY INFORMATION:


Use the instrument only as specified in this manual. Otherwise, the protection provided by the instrument may be impaired. Refer to the safety information below and appearing throughout the manual.

### A. WARNINGS



- This calibrator is designed for interior use only.
- Inspect the instrument for damage before each use.
- Do not use the instrument if it appears damaged or operates abnormally.
- If the instrument is used in a manner not in accordance with the equipment design, the operation of the instrument may get damaged.
- Do not place the instrument under a cabinet or other structure. Leave enough clearance to allow for safe and easy insertion and removal of probes.
- Do not use this instrument for any application other than the calibration work. Any other use of the instrument may cause unknown hazards to the user.
- Do not operate near flammable materials.
- Calibration Equipment should only be used by Trained Personnel.
- Completely unattended operation is not recommended.
- Do not drop the probe stems into the 'well'. This type of action can cause a shock to the sensor.
- Follow all safety guidelines listed in the user's manual.

- **ELECTRICAL SHOCK** 
  - This instrument must be plugged into a 230 VAC, 50Hz (optional 115V, 60Hz), electric outlet only. The power cord of the instrument is equipped with a three-pin grounding plug for your protection against electrical shock hazards. It must be plugged directly into a properly grounded three-pin socket. The receptacle must be installed in accordance with local codes and ordinances. Do not use an extension cord or adapter plug.
  - If supplied with user accessible fuses, always replace the fuse with one of the same rating, voltage, and type.
  - Always replace the power cord with an approved cord of the correct rating and type.
  - If a main power supply fluctuation occurs, immediately turn off the instrument. Power bumps from brown-outs could damage the instrument. Wait until the power has stabilized.

- **CAUTIONS:** 
  - Always operate this instrument at room temperature between 10°C and 40°C (5°C to 50°C). Allow sufficient air circulation for the instrument by leaving at least 6 inches (15cm) of clearance around the instrument.

- Component life time can be shortened by continuous high temperature operation.
- Use of this instrument at HIGH TEMPERATURES for extended periods of time requires caution.
- Do not turn off the instrument at temperatures higher than 100°C. This would create a hazardous situation. Select a set-point less than 100°C and allow the instrument to cool before it turning OFF.
- The high temperatures present in dry-wells designed for operation at 300°C and high may result in fires and severe burns if safety precautions are not observed.
- Do not leave the inserts in the instrument for prolonged periods. It may cause damage due to high operating temperature of the instrument.
- Do not slam the probe sheath into the 'well'. It may cause a shock to the sensor and affect the calibration.
- This instrument and the thermometer probes are sensitive instrument that can be damaged. Always handle those devices with care.
- Do not operate this instrument in an excessively wet, oily, dusty, or dirty environment.
- Do not use the instrument if the cooling fan located at the back of the instrument is out of order.
- Ensure a free supply of air to the Fan grill located at the back of the instrument.

- **HOT SURFACE:**

- Do not touch the 'well' access surface of the instrument.
- The block vent may be very hot due to the fan blowing across the heater block of the instrument.
- Do not touch the 'Well' or the Insert while the calibrator is heating up, they may be very hot.
- Do not touch the tip of the sensor when it is removed from the Insert /'well', it may be very hot.
- The air over the 'well' can reach temperatures greater than 200°C for high temperature (400°C and higher) dry-wells. Probes and inserts may be hot and should only be inserted and removed from the instrument, when the instrument is set at temperatures less than 50°C. Use extreme care when removing hot inserts.

- **INTRODUCTION:**

Temperature Calibrator (CALI-650H1/H2) is used for calibrating RTD and Thermocouples. The LED in the front panel continuously shows the current 'well' temperature. Desired temperature is set in the cal control by holding \* key and pressing / simultaneously. Proper use of the instrument will provide accurate calibration of temperature sensors.



MODEL	CALI-350H1	CALI-350H2	CALI-650H1	CALI-650H2
RANGE	10°C above ambient to 350°C		20°c above ambient to 650°C	
RESOLUTION	0.1°C		0.1°C	
ACCURACY	±1°C		±1.5°C	
STABILITY	±0.3°C	±0.4°C	±0.5°C	±0.6°C
STABILISATION TIME	15 MINUTES			
‘WELL’ DIA	25mm			
‘WELL’ DEPTH	120mm	200mm	120mm	200mm
HEATING TIME (TO MAX)	20minutes	28 minutes	20minutes	40 minutes
COOLING TIME (TO 100°C)	45min	60min	60min	180 min
POWER SUPPLY	230VAC ± 10% / 50Hz 115VAC ± 10% / 60Hz (optional)			
POWER CONSUMPTION	500VA		1100VA/1300VA	
SWITCH TEST FACILITY	5VDC			
INSTRUMENT DIMENSION	160*350*325mm	160*420*325mm	160*350*325mm	160*420*325mm
INSTRUMENT WEIGHT	7Kg	8.5Kg		11Kg
INTERCHANGEABLE THERMOWELL	¼" & ½" Bore Dia standard. Other sizes optional.			

### **3.2 ENVIRONMENTAL CONDITIONS:**

This instrument should not be operated in an excessively dusty and dirty environment.

The instrument operates safely under the following conditions:

- Operating temperature : 15°C to 40°C.
- Storage Temperature : 10°C to 50°C.
- Ambient relative humidity : 40–75% RH
- Protection class : IP10

### **3.3 WARRANTY:**

MRC Instruments & Electronics Private Ltd warrants these products to be free from defects in material and workmanship under normal use and service for a period of one year from the date of dispatch. This warranty extends only to the original purchaser and shall not apply to any product which, in MRC's sole opinion, has been subject to misuse, alteration, abuse or abnormal conditions of operation or handling MRC's obligation under this warranty is limited to repair or replacement of a product which is returned to MRC within the warranty period and is determined, upon examination by MRC, to be defective. If MRC determines that the defect or malfunction has been caused by misuse, alteration, abuse or abnormal conditions or operation or handling, MRC will repair the product and bill the purchaser for the reasonable cost of repair

- **QUICK START:**

- **4.1 UNPACKING:**

Unpack the instrument carefully and inspect it for any damage that may have occurred during dispatch. If there is transit damage, notify MRC immediately.

Verify that the following components are present:

- CALI-650H1/H2 instrument.
- Insertion tube – ¼" & ½"
- Insert Removal Tool
- Switch test leads
- Power Cord
- Instruction manual.
- Test leads
- Calibration certificate.
- RS232 software (optional)
- RS232 cable (optional)
- Software manual (optional)
- Software CD (optional)
- Spare fuses.
- Warranty certificate.

- **4.2 SET-UP:**

- **SET-UP:**

1. Switch ON the instrument
  - Set value should be zero.
  - Read value should show the ambient temperature.
  - Set any temperature in the display.
  - If the cal control shows the LED heating pulse, then we can make sure that the instrument is in working Condition.

Insertion tube diameter is selected according to the diameter of the sensor to be calibrated. The cal control will illuminate and the fan will begin quietly blowing air through the instrument after the illumination of the cal control. Sensor is inserted in the insertion tube and set the desired temperature in the display. Heater block gets heated and meets the desired set temperature with the help of PID controller.

- **PARTS & CONTROLS:**

- 5.1 GENERAL ASSEMBLY:**



- **DISPLAY PANEL:**



- **Green Display** : Process Temperature
- **Green LED** : Output Indicator  
(Flashing green bulleted Square in the top left Corner).
- **Red LED** : Temperature Over range Indication, set for +10% of maximum range of the instrument.  
(Flashing red bulleted square in the bottom right corner)

### 5.3 HEATER BLOCK:

The “Block” is made of copper for CALI-650H1/H2 provides a relatively constant and accurate temperature environment in which the sensor that is to be calibrated is inserted. A 0.25 inch diameter ‘well’ is provided that may be used for sensors of that size or may be sleeved down with various sized multi-hole probe sleeves. Heaters surround the block assembly and provide even heat to the sensor. A high-temperature platinum RTD (Thermocouple for CALI-650H1/H2) is embedded at the base of the block assembly to sense and control the temperature of the block. The entire assembly is suspended in an air cooled chamber thermally isolated from the chassis and electronics.

- **OPERATING PROCEDURE:**

The calibrator can be operated in 230V/115V supply. It can be selected by using sliding switch located in the Front panel of the instrument.

**OPERATIONAL PROCEDURE:**

- a) Connect the power cable to the Dry Block Calibrator.
- Switch ON the instrument
  - Set the required temperature in the PID Controller as follows.
  - Press “\*” key and “”key simultaneously to increase the set temperature.
  - Press “\*” key and “”key simultaneously to decrease the set temperature.
  - Insert the sensors, which are going to be calibrated into the corresponding hole of the inserts.
  - Allow the bath to stabilize at the set temperature.
  - Connect test probe to the indicator and note down the readings of test probe.
  - Repeat Steps d to h for other set of calibration points.
  - After calibration is over, set the bath temperature to ambient and allow it to cool.
  - After reaching the ambient temperature, switch off the power supply.

- **TO SELECT THE UNIT (C / F):**
  - Press the "" key together and hold for 3 seconds.
  - Use the or key to locate the LEVEL Function
  - Press and hold the \* key and use the or key to get LEVEL 2.
  - Use the or key to get "Unit" on the display
  - Press and hold the \* key and use the or key to get the required Unit (C or F)
  - Press or key together for 3 seconds to exit setup.
- **TO SELECT THE RESOLUTION :**
  - Press the key "" together and to go setup mode.
  - Use the key or to get the LEVEL Function.
  - Select level 2 by pressing \* and key together.
  - Select display "disp" by pressing key.
  - Press \* and or key to select resolution.
  - Press or key together for 3 seconds to exit setup.
- **SWITCH TEST :**
  - Connect the output of the Thermostat switch to the switch test sockets using the test probes supplied.
  - b) If the thermostat switch is of "Normally Closed" type , the LED will glow and will stop glowing when the switch changes its state.
  - If the thermostat switch is of "Normally Open" type, the LED will not glow initially and will glow when the switch changes its state.

## **7.0 STORING AND TRANSPORTING THE CALIBRATOR:**

### **STORING:**

- a) If the calibrator has been heated up to temperatures above 100C / 212F, you must wait until the instrument reaches a temperature at 10C / 50 above ambient before you switch off.
- If required, remove the inserts from the calibrator using the tool for removing insertion, supplied with the instrument.

- The Sensor under test must always be removed from the calibrator after use. There is risk that the sensors may become stuck if it is not removed.

#### **TRANSPORTING:**

- a) Never leave the hot inserts that may have been removed from the calibrator unsupervised, which constitutes fire hazard.
- Transport the calibrator to the packing box after use and ensure that the instrument has cooled to temperature 10C / 50 above ambient before placing it in the packing box.

### **8.0 MAINTENANCE & SERVICING:**

#### **MAINTENANCE:**

- The calibration instrument has been designed with ease of operation and simplicity of maintenance.
  - Proper care of the instrument requires very little maintenance. Avoid operating the instrument in an oily, wet, dirty, or dusty environment.
- If the outside of the instrument becomes soiled, it may be wiped clean with a damp cloth and mild detergent. Do not use harsh chemicals on the surface which may damage the paint.
- It is important to keep the 'well' of the calibrator clean and clear of any foreign matter. Do not use fluid to clean out the 'well'.
- If a hazardous material is spilt on or inside the equipment, the user is responsible for taking the suitable steps to clean the equipment.
  - Do not use fluids to clean out the 'well'. It may leak into the instrument and cause damage



**SERVICING:****SOCKET FUSE:**

- Locate the main fuse in the fuse box in the socket.
- Open the lid of the fuse box using a screw driver.
- Replace the fuse with the same rating.

**TRANSFORMER, HEATER & CONTROL FUSE:**

- Locate the Transformer Fuse, Heater Fuse and Control Fuse in the corresponding fuse holders marked in the equipment.
- Open the Fuse holder cap by rotating it in anti clockwise direction.
- Replace the fuse.
- In case of any problem Return to the MRC for service, after filling the service information form

**9. Service information**

**Customer Information :**

**Date :**

**Customer Name and Address:** \_\_\_\_\_

**Contact person & Dept:** \_\_\_\_\_

**Fax no. / Phone no.:**

**E-mail:**

**Your order no.:** \_\_\_\_\_

**Delivery Address:** \_\_\_\_\_

**Instrument information:**

**Model and Serial No.** \_\_\_\_\_

**Warranty Claimed**    **Yes:** \_\_\_\_\_ **No:** \_\_\_\_\_ **Original Invoice No.** \_\_\_\_\_

**Calibration Check**

**Service**

If Service problem encountered, please mention  
briefly. \_\_\_\_\_

**Diagnosis information / Cause for return:**

**Diagnosis / Fault description:**

**Special requests:**